Cost Assessment of Water Resources Degradation (CAWRD)
An Overview

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Why Estimating the Cost of Inaction

- **Environment is a Public Good**
- **It is affected by Externalities**
- **These externalities can lead to market fialure as the price do not reflect the real value of the social cost or the benefits of an action or a project**

Decision makers are unaware of the economic and financial implications of environmental degradation

- **Serious environmental problems related to air, water and waste are a drain on the economy**
  - How much is clean water, access to sanitation and good hygiene worth?
- **While the investment costs of providing eg: clean water and sanitation services are relatively well known**:
  - the benefits resulting from such investments are more difficult to quantify
- **There is therefore a need to quantify the benefits or "costs avoided"**
  - For the government to take informed policy decisions

Negative Externalities Lead to Market Failure

- **One of the most important market failures is due to *negative externalities*.**
- **A negative externality occurs where a transaction imposes costs on a third party (not the buyer or seller) who is not compensated.**
- **Environmental externalities generally occurs for 3 reasons:**
  - **Common resources**
  - **Public goods**
  - **Future generations (sources of externality include carbon emissions)**
- **In these cases, *private equilibrium* is not the same as the *social equilibrium* which includes all costs**

This may also hinder investments by the private sector

- Private capital can flow only if:
  - private investments meet the basic criteria of sector creditworthiness,
  - there is a secure legal framework, sound regulatory regime and;
    an efficient banking sector
- Translating these criteria for the environment means:
  - internalizing the costs of past environmental damage
  - adopting a realistic and enforceable environment protection law and workable EIA system,
  - developing a realistic and predictable environmental standards and guidelines and;
  - establishing responsible banking sector to provide environmental friendly loans and minimize liability exposure.

And Rethinking the Investment Programs

- The cost of inaction is translated into averted benefits, which are gauged in terms of environmental externalities . The latter are negatively affecting the financial and economic profitability (rate of return) of both public and private projects therefore hampering private sector investments and economic growth.
- Investment needs are usually much larger than the Government (i.e. loans or budget) can realistically cover...therefore, there is a need to look into policy measures that would include: rethinking the investment program, the time framework (stretching the investments over longer timeframe), the standards, the targets, sources of finance, etc.
- In view of resource constraints, low WW tariffs and low WW cost recovery, decision-makers have to optimize choices based on the:
  - · The disentanglement between financing network and treatment in the case of waste water, and between financing collection and disposal in the case of solid waste , i.e. priority ONE the is collection network (highest rate of return because of health benefits) which is seen as private benefits (up to a point) and therefore has (relatively) high willingness to pay
  - · The selectivity of the pollution abatement technology and the level of treatment
  - The affordability of the investments by the utilities
  - · The social benefits to accrue as a result of these investments

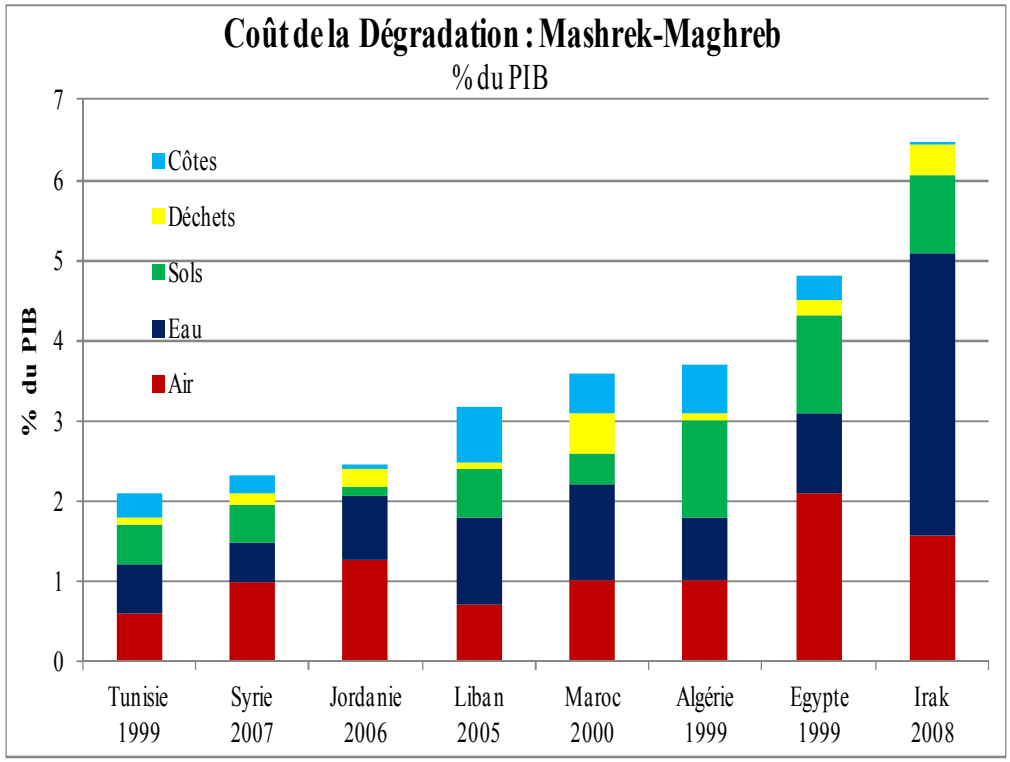
Necessity to Estimate the Monetary Value

- **Monetary values on variations of environmental quality demonstrate links with economy. This requires the PRICE of environmental goods and services to be determined.**

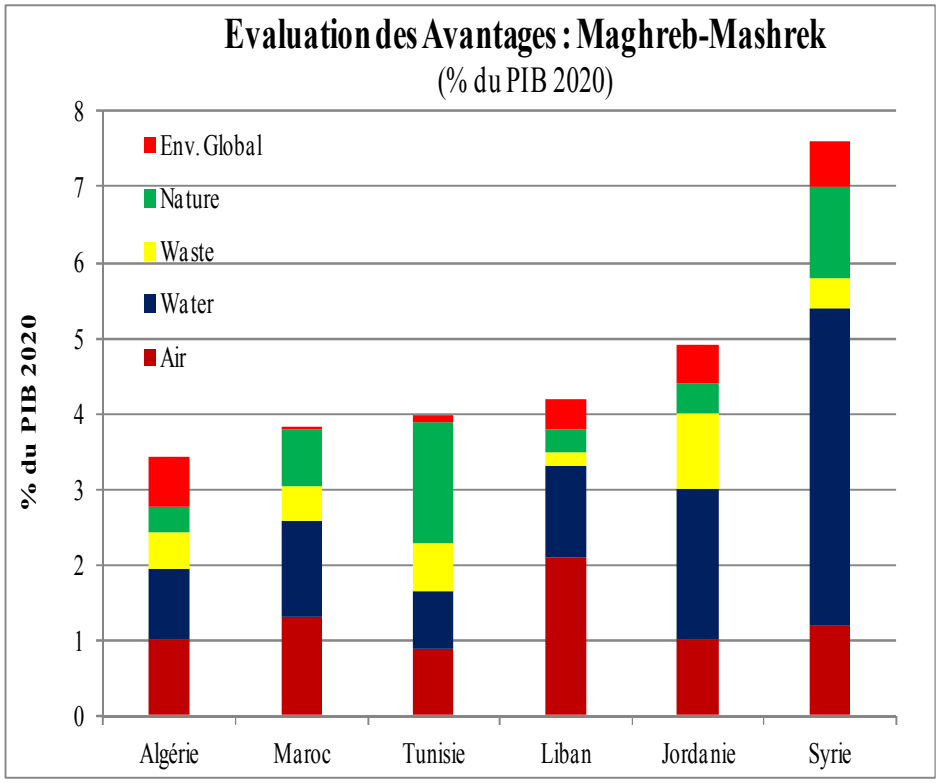
- Two important points :
  - **In economics, we estimate the economic value of the variation of environmental quality and not the environment itself.**
  - **The economic value of environment is instrumental and anthropocentric. Varies according to individual preferences and hence varies across countries and regions**

The Cost of Environmental Degradation (COED) was Estimated in nine countries of the Middle East and North Africa Region (MENA)

METAP/World Bank



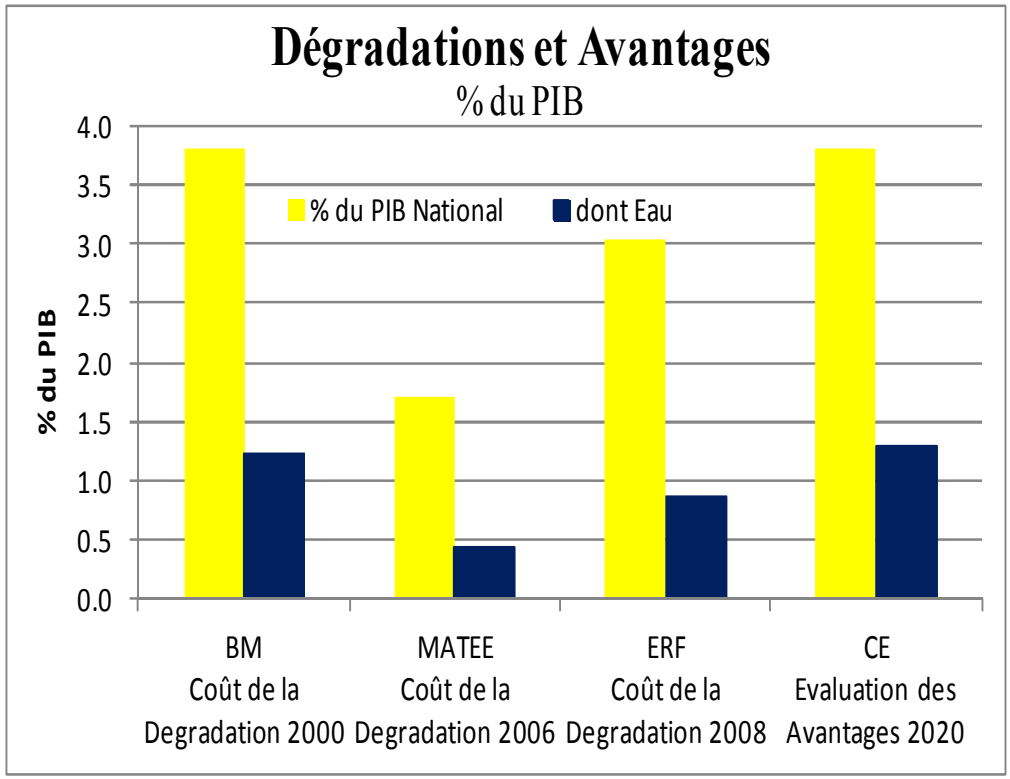
European Commission



The Cost of Water Degradation (COWD) was estimated successively by METAP/ the World Bank , The Economic Research Forum and the European Commission

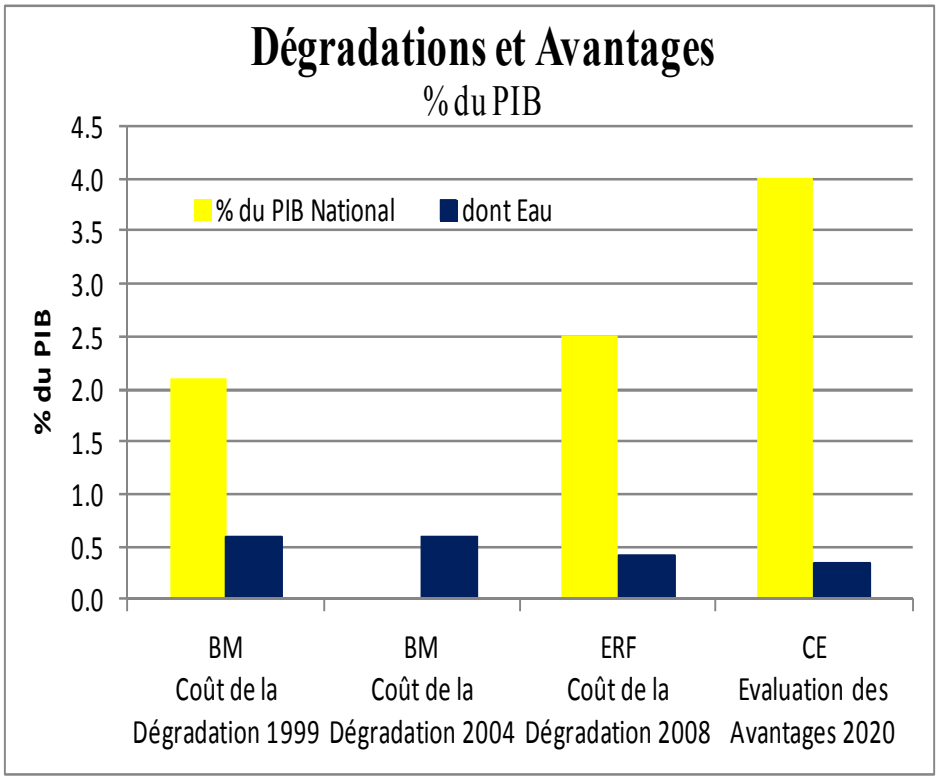
COWD of Morocco

0.87-1.22 of GDP



COWD of Tunisia:

0.67-0.7 of GDP



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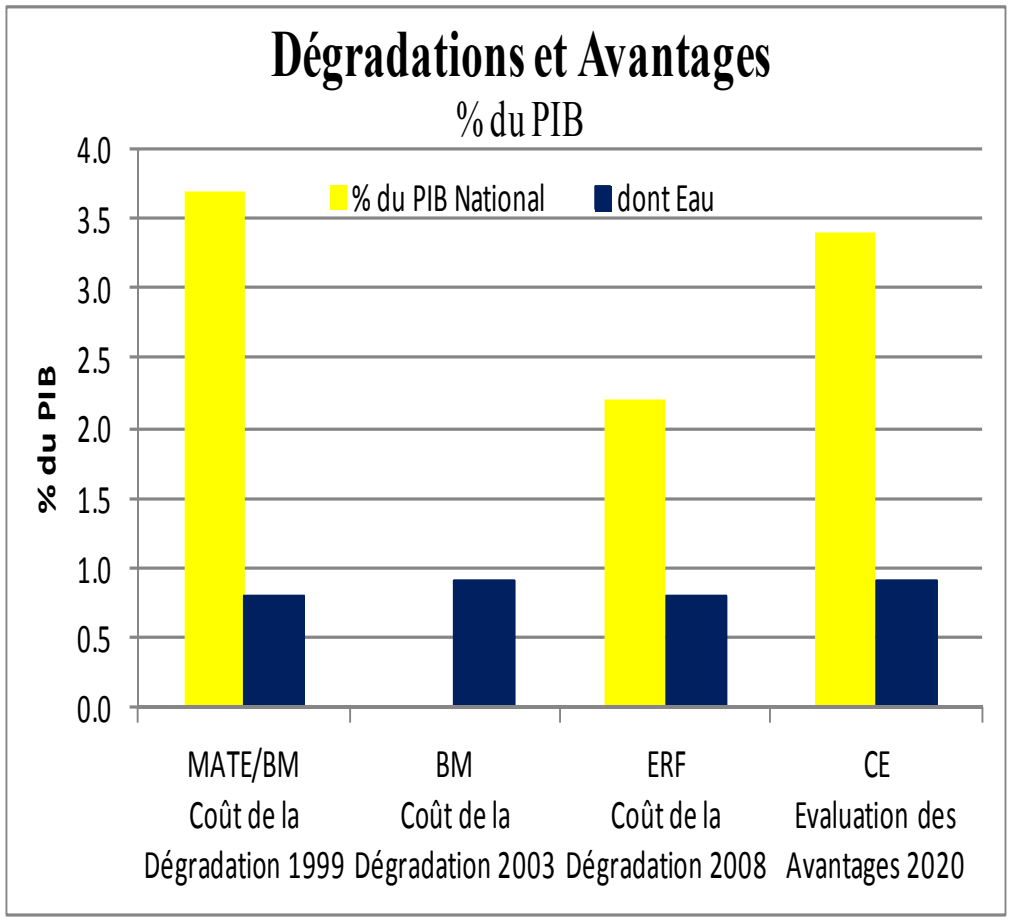
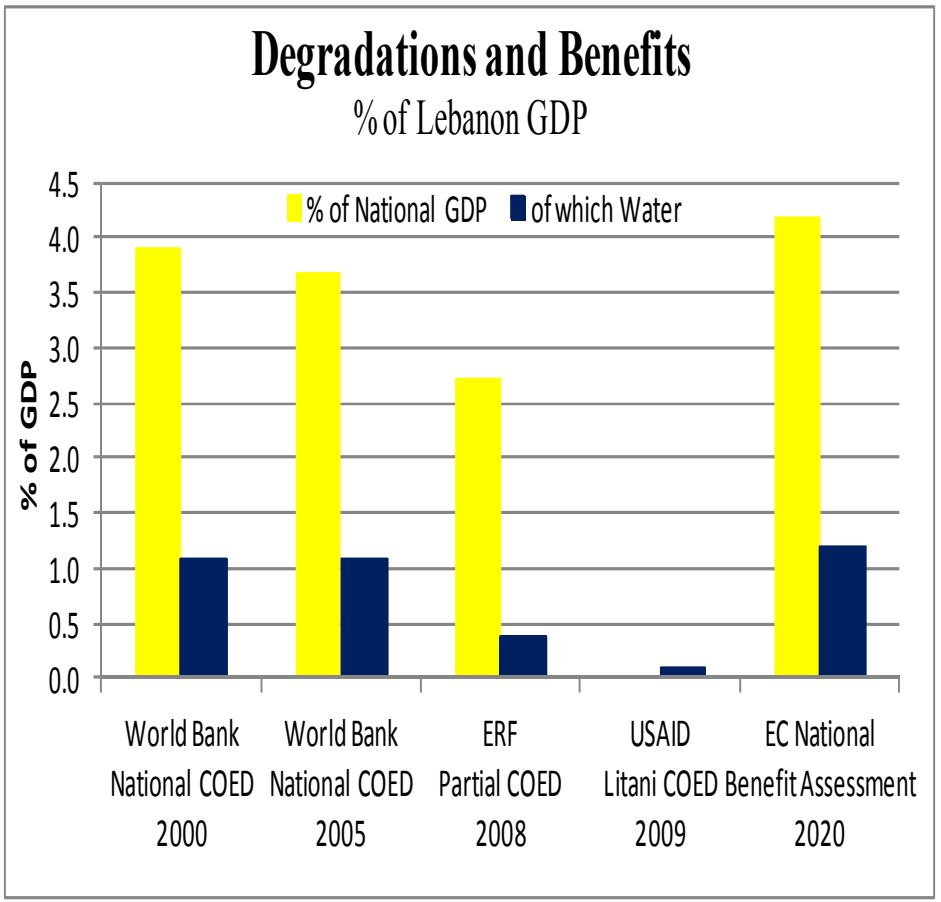
COWD of Algeria 0.8-0.9 of GDP



COWD of Lebanon

1.07-1.08 of GDP



However, these national estimates are limited

- These estimates in terms of orders of magnitude were useful to alert policymakers about the seriousness of the water degradation problem.

- They cannot be used directly to provide an OPERATIONAL response as they did not include the costs and benefits of possible solutions to the watershed degradation problem which would affect the NON OPTIMAL USE of THESE RESOURCES.

Decisions should be taken at the Basin level for the Management and Protection of Water Resources

- No precise problems identification and no monetary evaluation associated with water degradation have been undertaken at the Basin level in the Middle East and North Africa Region
- However, It is at the basin level that decision should be taken on the management and protection of water resources .

Why An Economic Valuation of Water Resources at the Basin Level

- Much of the past interventions at the national level have been on "engineering" investments without a systematic evaluation of the benefits achieved, and without consideration of other investments' alternatives that would generate both economic and environmental benefits.
- Less is even known at a more detailed river basin level as no accurate identification of problems and evaluation of the associated costs of degradation have been undertaken so far. However it is at the basin level, that decisions have to be taken as to the management, and the protection and conservation of water resources

Cost of Water Degradation and Remediation should be used to take decisions at the basin level

- Choice of general priorities based on cost-benefit ratios (e.g. to invest in waste water treatment or in forestation),
- Choice of concrete projects and activities based on cost-benefit ratios or Net Present Value (NPV),
- General or project priorities based on analysis of cost-effectiveness (in cases where monetary valuation is difficult),

The SWIM-SM is the First Project that estimated the cost of water resources degradation and remediation at the Basin level

- **SWIM-SM is a Regional Technical Support Program that promotes actively the extensive dissemination of sustainable water management policies and practices in the region given the context of increasing water scarcity, combined pressure on water resources from a wide range of users and desertification processes, in connection with climate change**
- **Its specific objectives are to :**

  (i) raise the decision-makers and stakeholders' awareness in the Partner Countries on existing and upcoming threats on water resources;

  (ii) support the Partner Countries in designing and implementing sustainable water management policies at the national and local levels, in liaison with on-going relevant international initiatives; and

  (iii) contribute to institutional strengthening, to the development of the necessary planning and management skills and to the transfer of know-how

- **The Partners Countries (PCs) are: Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, the occupied Palestinian territory, Syria and Tunisia**

SWIM Support Mechanism: Project Components

The Cost Assessment of Water resources degradation is a sub-component of Water Governance and Mainstreaming

Why An Economic Valuation of Water Resources at the Basin Level

- **The Outcome of the Water Governance and Mainstreaming includes:**

  (a) Water considerations are promoted using a participative approach, also at local level;

  (b) Water concerns are mainstreamed in other relevant sectoral policies and in national development plans;

  (c) Economic valuation is carried out to assess the costs and benefits of mitigation actions on water degradation and

  (d) Climate change considerations are mainstreamed in national strategies, plans and policies, with primary emphasis on no-regret actions.

Achievement of the Outcome

In order to reach the outcome : A pillar on cost assessment of water resources degradation at the basin level was designed and implemented It consisted of 4 components:

- Cost of water resources degradation due to water and waste water pollution
- Cost Benefit or Cost Effectiveness Analyses of Remedial Actions and Preparation of Investment Interventions
- Building the capacity of the decision makers on the methodologies of economic evaluation
- Validation and Dissemination of the Investment Interventions

Criteria for the Selection of the Basins

- The water way is a major river in the country and is a source of potable water and irrigation
- The basin is a country priority for socio economic development and for integrated water demand management, however socioeconomic development in the basin has not kept pace with that of other regions in the country
- Rural population and livestock pressures on the land, coupled with inadequate land management , over exploitation of groundwater increasingly induce resource degradation
- Water pollution is an issue for water quality
- Climate change is emerging as a major challenge for the agricultural sector with increased incidence of flash floods

Basin Selection

- **Morocco -Oum Er Rbia**

Length of the River: 600 Kms
Watershed area: 34.735 Km2
Population: 5.2 million
The largest irrigated area in Morocco:
494.000 ha
Annual Water Resources: 2.31 million m3
Number of Dams : 16

- **Tunisia- The Medjerda**

Length of the River : 350 Kms
Watershed area : 15.930 Km2
Population:1.3 million
The longest river in Tunisia
Annual Water Resources : 4.5 million m3
Number of Dams : 9

Basin Selection

- **Algéria-The Seybouse**

  Length of the River: 240 Kms
  Watershed area: 6.471 Km2
  Population: 1.6 million
  Second longest river of Algeria
  Annual Water Resources: 408 million m3
  Number of Dams : 2

- **Lebanon- The Litani**

  Length of the River : 170 Kms
  Watershed Basin: 2.168 Km2
  Population: 1.04 million
  The first and longest river in Lebanon
  Number of Dams : 1

  – :

Objective of the CAWRD

- The main objective is to value the cost of water resource degradation (CAWRD) in a selected watershed to assist decision-makers at national and local levels to identify and prioritize specific actions to improve the management of this basin through potential funding of projects related to environmental and water benefits and the reduction of negative externalities.
- This allows to bring the costs of degradation to a common denominator to prioritize selected investments based on cost/benefit analysis

Limitations of the CAWRD

The CAWRD is valued by using the available data – their source cannot be totally reliable. Moreover, due to the lack of data many hypothesis were assumed . The results are therefore considered as an indicative order of magnitude with lower and higher bound in order to take into account the uncertainties

Description of the CAWRD

- Assess the costs of water degradation caused by water contamination, salinity , water logging floods risk, dam siltation. In particular, it will estimate in monetary terms the impact of each problem on all water uses, to the extent that data allow.
- Identify a priority for intervention (investment projects) in a specific location of the river, particularly affected by pollution or natural resources degradation
- Undertake an economic analysis (such as cost-benefits analysis or cost effective analysis) of potential interventions necessary to reduce water pollution/ natural resource degradation in the areas previously selected; and will identify cost-effective measures to reduce pollution and natural resources degradation and improve the overall quality of the river.

Approach

- The cost of water resources degradation is a measure of the loss in a nation's welfare due to water degradation and depletion. As such, it includes losses at three levels:
  - social, e.g. premature death, pain and suffering from illness due to inadequate quality of drinking water
  - economic e.g. reduced soil productivity due to irrigation with saline water, lower energy production due to dam sedimentation.
  - environmental, e.g. reduced recreational value for lakes and beaches due to water contamination
- It places a monetary value on the consequences of such degradation. This often implies a three-step process:
  - quantifying water degradation (e.g. monitoring water quality).
  - quantifying the impacts of degradation on different water uses (e.g. reduced agricultural production due to water salinity and waterlogging)
  - estimating the impacts in monetary terms (e.g. estimating the cost of soil productivity losses).

General Benefits from the CAWRD

By assigning monetary values to water degradation and remediation at river basin level, the study:

- **Provides a comprehensive and holistic approach for assessing the impacts of water degradation;**
- **Offers a useful instrument to rank the different types of degradation costs according to their relative importance;**
- **Gives decision-makers a tool to improve the integrated water resource management at river basin level**
- **Improves the investment opportunities of the government at the governorate/watershed/basin and sub- national levels in order to effectively curb water degradation**
- **Associates the stakeholders and interest groups in the identification of the water issues, definition of remediation plans and preparation of investment plans**

مع خالص شكري
وامتناني

Thank you
for your attention

Merci pour
votre attention

For additional information please contact:
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